

WHAT IS CLAIMED IS:

1. A data processing system comprising:  
a memory (A, B, TG) for storing data;  
an input/output circuit (IO) for performing at  
least one of the operation of writing data in said  
5 memory and the operation of reading data from said  
memory;  
an arithmetic circuit (12, 12a, 12b) for arith-  
metics by using the data stored in said memory; and  
a control circuit (CNT, 13, 13A, 13B) for con-  
10 trolling the operations of said memory, said input/  
output circuit and said arithmetic circuit,  
wherein said arithmetic circuit has: a function  
to calculate the updated value of the output value of  
a neuron, which is stored in said memory, by using  
15 said neuron output value and the connection weight be-  
tween neurons; and a function to calculate the dis-  
tance (or similarity) between the desired value of the  
neuron output value stored in said memory and the neu-  
ron output value obtained.
2. A data processing system according to Claim 1,  
wherein said memory is stored with a plurality of in-  
put data having different characteristics.
3. A data processing system according to Claim 2,  
wherein said memory is stored with a desired value of  
the output value of the neuron.
4. A data processing system according to Claim 2,  
wherein said memory is constructed of a plurality of  
blocks, of which: the first block (A) is stored with  
the neuron output value ( $V_{is}$ ); and the second block  
5 (B) is stored with the connection weight ( $T_{ji}$ ) between

the neurons.

5. A data processing system according to Claim 4, wherein said memory further has a third block (TG) stored with the desired value of the neuron output value.

6. A data processing system according to Claim 5, wherein said memory is stored with at least one of said neuron output value and said connection weight between the neurons by using a plurality of bits.

7. A data processing system according to Claim 6, wherein the plural bits expressing the neuron output value or the connection weight between the neurons are partially used to express the codes of said neuron  
5 output value and said connection weight between the neurons.

8. A data processing system according to Claim 7, wherein said memory is constructed of memory cells each composed of one transistor and one capacitor.

9. A data processing system comprising:  
a memory (A, B, TG) for storing data;  
an input/output circuit (IO) for performing at least one of the operation of writing data in said  
5 memory and the operation of reading data from said memory;  
an arithmetic circuit (12, 12a, 12b) for arithmetics by using the data stored in said memory; and  
a control circuit (CNT, 13, 13A, 13B) for controlling the operations of said memory, said input/  
10 output circuit and said arithmetic circuit,  
wherein said memory includes a memory cell array

having: a plurality of data lines; a plurality of word  
lines (WA) arranged to intersect with said data lines;  
15 and memory cells (MC) arranged at the desired ones of  
said intersections, so that the data stored in the  
different plural memory cells can be read out to the  
different plural data lines intersecting with said  
word lines by selecting at least one of said word  
20 lines,

wherein said arithmetic circuit has a function to  
calculate the updated value of the neuron output value  
by using the data read out from said memory, and

25 wherein said input/output circuit has a function  
to write said updated value in said memory.

10. A data processing system according to Claim 9,

wherein said memory cell array is stored with the  
desired value of said neuron output values, and

5 wherein said arithmetic circuit includes means  
for calculating the distance (or similarity) between  
said desired value and the obtained neuron output  
value.

11. A data processing system according to Claim 9,

wherein said memory cell array is stored with the  
neuron output value and the connection weight between  
the neurons.

12. A data processing system according to Claim 9,

wherein said memory cell array is stored with a plu-  
rality of input data having different characteristics.

13. A data processing system according to Claim 9,

wherein said data processing system is formed over one  
chip.

14. A data processing system according to Claim 10,  
wherein said memory is constructed of a plurality of  
blocks, of which: the first block (A) is stored with  
the neuron output value; and the second block (B) is  
5 stored with the connection weight between the neurons.

15. A data processing system according to Claim 14,  
wherein said memory is stored with at least one of  
said neuron output value and said connection weight  
between the neurons by using a plurality of bits.

16. A data processing system according to Claim 15,  
wherein the plural bits expressing the neuron output  
value or the connection weight between the neurons are  
partially used to express the codes of said neuron  
5 output value and said connection weight between the  
neurons.

17. A data processing system according to Claim 16,  
wherein said memory is constructed of memory cells  
each composed of one transistor and one capacitor.

18. A data processing system according to Claim 14,  
wherein said memory further has a third block (TG)  
stored with the desired value of the neuron output  
value.

19. A data processing system according to Claim 18,  
wherein said data processing system is formed over one  
chip.

20. A data processing system comprising:  
a memory (A, B, TG) for storing data;  
an input/output circuit (IO) for performing at  
least one of the operation of writing data in said

5 memory and the operation of reading data from said memory;

an arithmetic circuit (12, 12a, 12b) for arithmetics by using the data stored in said memory; and

10 a control circuit (CNT, 13, 13A, 13B) for controlling the operations of said memory, said input/output circuit and said arithmetic circuit,

wherein said arithmetic circuit has: a function to calculate the updated value of the output value of a neuron, which is stored in said memory, by using  
15 said neuron output value and the connection weight between neurons; and a function to calculate the distance (or similarity) between the desired value of the neuron output value stored in said memory and the neuron output value obtained, and

20 wherein said data processing system is formed over one chip.

21. A data processing system according to Claim 20, wherein said memory is stored with at least one of said neuron output value and said connection weight between the neurons by using a plurality of bits.

22. A data processing system according to Claim 21, wherein the plural bits expressing the neuron output value or the connection weight between the neurons are partially used to express the codes of said neuron  
5 output value and said connection weight between the neurons.

23. A data processing system according to Claim 22, wherein said memory is constructed of memory cells each composed of one transistor and one capacitor.

24. A data processing system according to Claim 23,